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northern edge of the moon. The fourth satellite was the only one visible until within a few minutes before the time of conjunction, when the egress of the first took place (at about $13^h\ 5^m$ G. M. T.). Being in the south-following portion of its apparent orbit, it was caught by the moon in consequence of her rapid advance in declination northward, disappearing at the dark edge of the moon, and reappearing at the bright edge. My large equatoreal not having been remounted since my removal from Wateringbury, I employed a very perfect refractor by Merz of Munich, having an aperture of only 2½ inches. With this the fourth satellite, though at times faint, and seen with difficulty when the air was much disturbed, yet was traced satisfactorily up to the moon's dark edge; but at the reappearance of the bright edge, it was not seen with certainty till it was distant from the limb about two of its own diameters. The duration of its occultation is therefore uncertain. The shadow of the first satellite was very obvious on the large belt in the southern hemisphere of the planet.

"P.S. The approximate geographical position of my present temporary residence is: longitude, $3^m\ 40^s$ west; latitude, 51° 46′ north.

"*Haddenham, Bucks,* 10*th November,* 1856."

In answer to some inquiries on the part of Mr. De La Rue, Mr. Dawes makes the following observations:—

"I am obliged by your note of the 12th, to which I have been, till now, unable to reply. I was struck, as you were, with the difference of tint of *Jupiter* and the moon. Though the approach was so much closer as seen from here than at Nottingham, I did not perceive the slightest distortion of *Jupiter's* form similar to that described by Mr. Lowe in his letter to the *Times.*

"*Haddenham, Bucks,* 20 *Nov.* 1856."

Observations of Jupiter, during October 1856. By Warren De la Rue, Esq., Ph.D., F.R.S.

"*Jupiter* has been during the present apparition a most remarkable and interesting object, both on account of the great amount of detail to be seen on his belts, and also of the changes which obviously occur in them during very short intervals. The general appearance of the belts recalls very vividly the mottled and streaked appearance frequently presented by clouds, but no description can convey an accurate notion of the markings on the planet without the aid of graphic representations. There is, however, very great difficulty in making drawings of *Jupiter,* in consequence, partly of the overwhelming amount of details to be seen, and partly on account of the short period allowed by the rapid axial rotation of the planet for their delineation. For unless the drawing be completed within twenty to thirty minutes at most,

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the change of aspect will have become so great, in consequence of the foreshortening and disappearance of some parts, and the fresh appearance and the elongation of others, that no reliable result will be obtained. And it frequently happens, moreover, that observations begun most auspiciously are rendered useless by the definition suddenly becoming bad and continuing so during the short interval at command; and by the time the atmosphere has quieted, the planet may have rotated so much that it is necessary to recommence, to be disappointed possibly again and again. Notwithstanding many such disappointments I am enabled to lay before the Society four faithful drawings, three of them executed by myself, and the fourth by my chemical assistant and friend Dr. Müller, who is a rapid and accurate draughtsman, and whose faithfulness in planetary delineation I have had many opportunities of testing.

"The southern belt of *Jupiter* appeared, on most occasions on which I have observed it, to be somewhat darker than the northern, which has always been more diffuse and more broken up by intervals and streaks; the northern also has invariably been the broader of the two. Both belts are unmistakably brown as compared with the general tint of the planet, which, about the poles, has a decidedly yellow hue, and more obviously so towards the north. Besides the very conspicuous broad belts, there were observed several delicate and faint streaks extending to a greater or less distance across the disk, but seldom entirely across it; these faint streaks just under the north belt were decidedly yellow. On the eastern limb of the planet (the most distant from the sun), I have observed a decided amount of shading, an observation confirmed by Dr. Müller.

"The belts of *Jupiter* have been usually represented to be bounded by straight lines: in former years I have always had the impression of an appreciable amount of curvature in them, and this observation I have been enabled to confirm during the present apparition. The belts are now so irregular in outline that it is quite necessary to watch for a favourable opportunity in order to test this impression satisfactorily; and it is absolutely essential that there should be no atmospheric tremor; fortunately such a rare occasion was presented on the 30th October at $7^h\ 50^m$ G.M.T. when the northern belt was sufficiently regular in its southern outline to admit of its elliptical form being made evident by laying a spider line tangentially upon it; the curvature, though very apparent, is small, and has its convexity towards the southern limb.

"The drawings represent the planet at the following epochs: October 12th, 12th hour G.M.T.; October 25th $9^h\ 8^m$ with the first satellite and its shadow upon the disk; and two drawings on October 27th, the one at $8^h\ 50^m$, the other by Dr. Müller at $9^h\ 45^m$, when the planet had rotated 33° 15′. The drawings of October 12th, and the first drawing of October 27th, represent the same hemisphere (the difference being only 15° 29′) and show very clearly the changes which during the interval had taken place in the belts which still retained some of their general features.

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